



Evaluating Low Impact Development Practices for Storm water Management on an Industrial Site in Mississippi



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TVA's public service mission

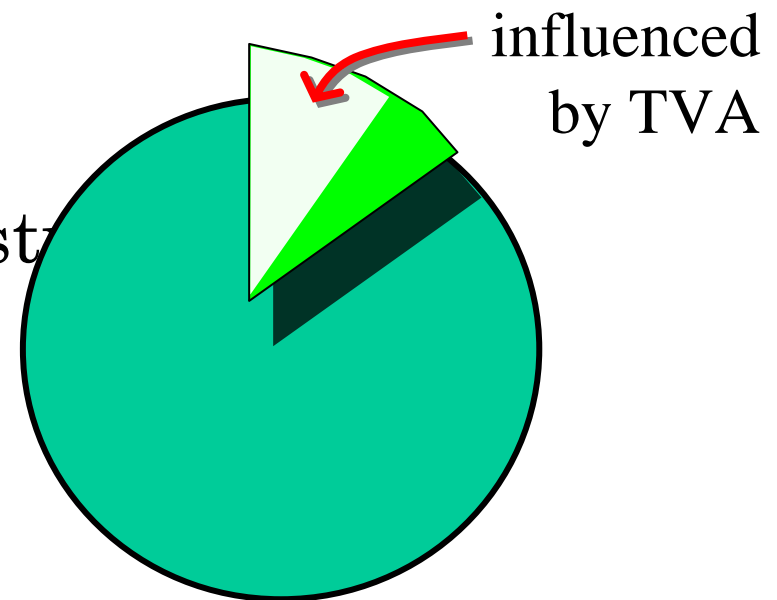
- ◆ Support sustainable economic development
- ◆ Supply affordable, reliable power
- ◆ Manage a thriving





Why LID for industrial sites?

- ◆ 70% reached by TVA
- ◆ Tennessee annual Greenfield development
 - 80,000 acres – all
 - 12,000 acres – industrial
- ◆ Focal point for development



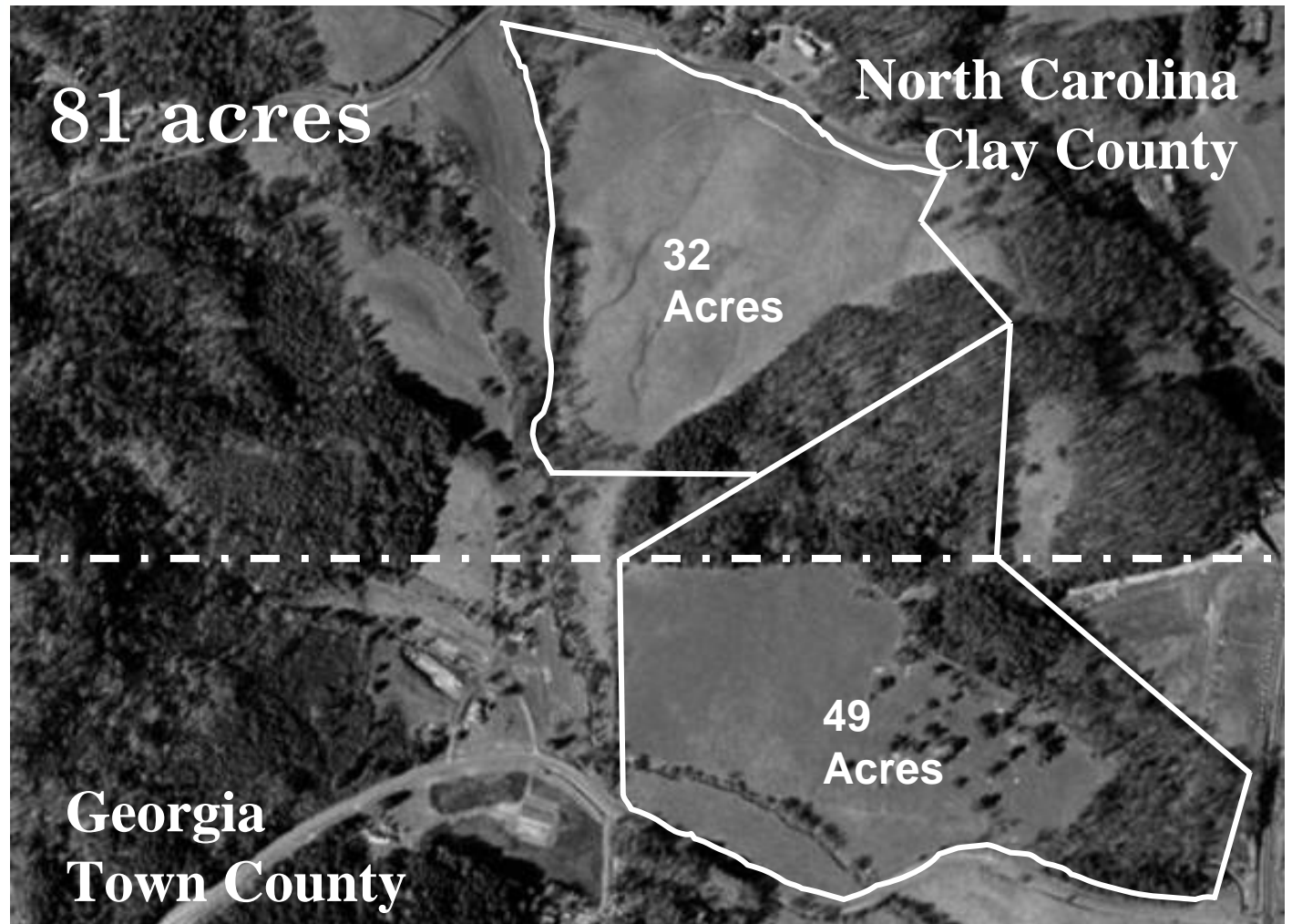


Industrial Site Conservation Design Guide

- ◆ Conservation design best practices
 - Roads and parking lots
 - Site development
 - Conservation of natural areas
 - Building design, placement and operation
- ◆ Analysis tools
- ◆ Three compelling regional pilots



Clay/Towns Industrial Park Site

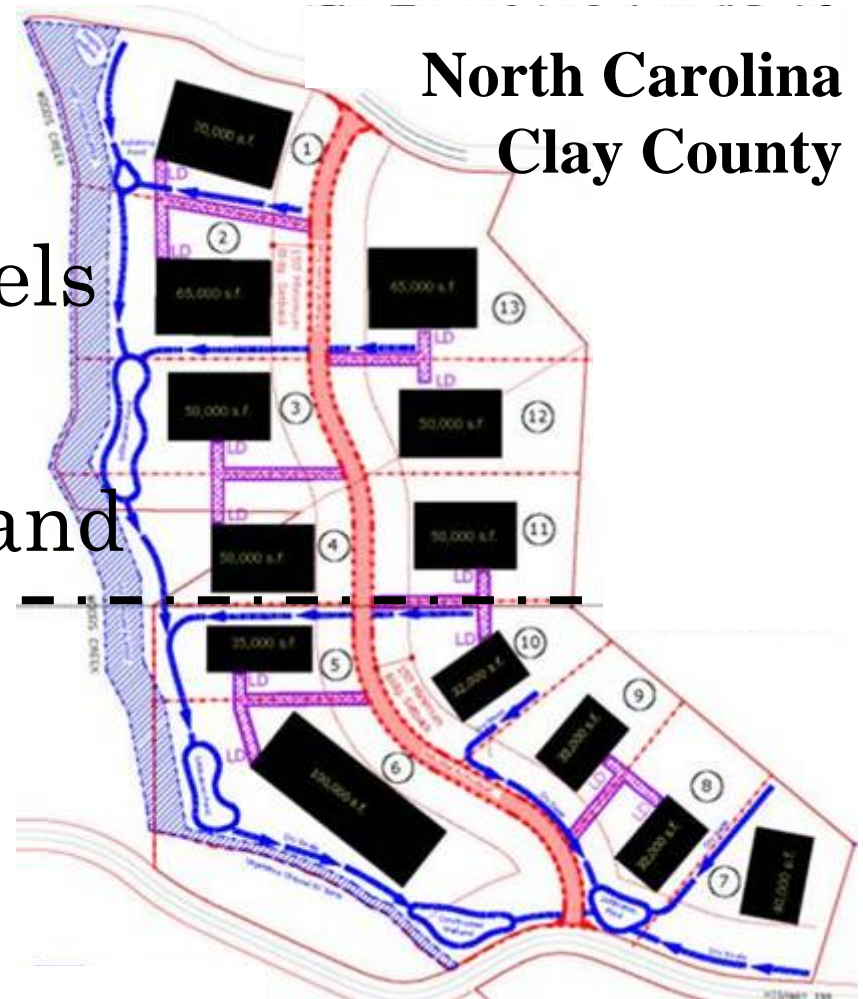




Clay/Towns Industrial Park Conservation Design

- ◆ Dry swales
- ◆ Vegetative channels
- ◆ Infiltration basin
- ◆ Constructed wetland
- ◆ Stream buffer

**Georgia
Town County**





Neuhoff Brownfield Project Site



- 25 acres
- downtown Nashville

Neuhoff Brownfield Project Conservation Design



Golden Triangle Regional Airport Site





Industrial Site Conservation Design Guide

◆ Pilot activities

- find optimum mix of best practices
- implement best practices
- monitor site

CH2MHILL LID philosophy



**Facilitate sustainable
economic development**



**Preserve natural
ecosystems**

Unifying theme:
promoting economic
development and
preserving the
environment
can be complementary
objectives

Low-impact development (LID) balances development and watershed protection

◆ What is LID?

- An approach to site design that **mitigates the impacts of development** on stormwater flows and water quality



Traditional streetscape



LID streetscape



Low-impact development (LID) balances development and environmental protection

◆ How does LID work?

- Uses “stormwater micro-management” to help a developed site mimic the site’s original hydrology
- Combines site planning/lot-scale control options to minimize, infiltrate, slow down, retain, detain, and treat stormwater



Traditional roof design



LID roof design



LID site planning principles

- ◆ Control volume at the source
 - Increase interception
 - Increase on-site retention
 - Encourage infiltration
- ◆ Simple is safe
 - Use natural soil and vegetation
 - Avoid labor-intensive mechanical devices
 - Distribute maintenance among site users



LID site planning principles

- ◆ Hydrologically functional landscaping
 - Increase foliage interception
 - Increase infiltration
 - Increase soil moisture storage capacity
 - Slow down runoff flow
 - Moderate temperature
 - Encourage plant uptake of contaminants



Demonstration



LIFE™ Model Application

**Golden Triangle Regional
Airport**

**American Eurocopter Site
Mississippi**

Tennessee Valley Authority



Site location



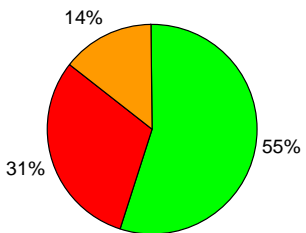


Site description

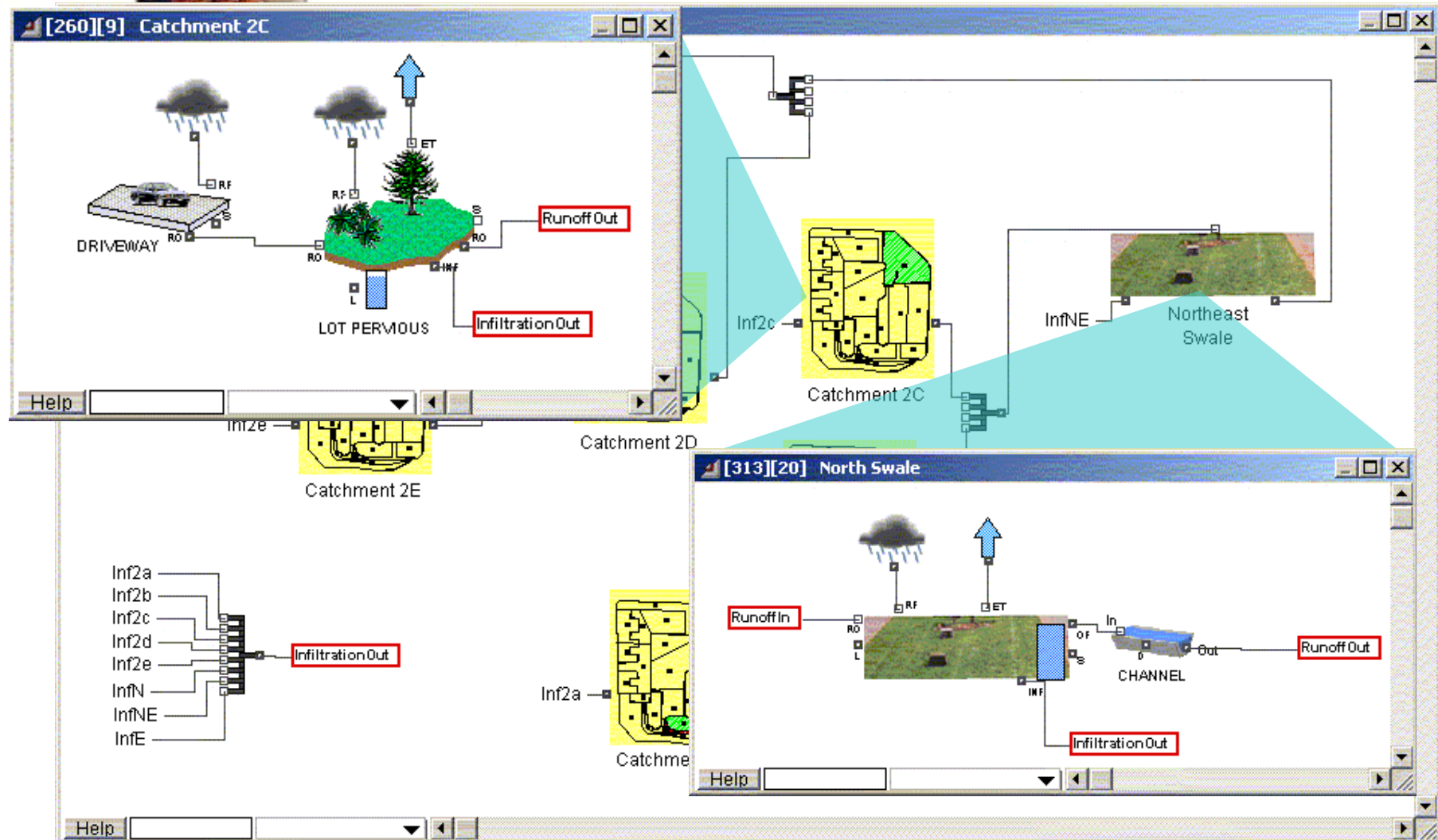
- ◆ Civil aircraft manufacturing
- ◆ 90-acre site, 14 acres already developed
- ◆ 45% impervious
- ◆ **Goal:** retrofit 14-acre site to reduce water quantity & quality impacts



Site plan for the proposed development of 100 acres of wetlands. The plan shows various phases of development, including Phase One (87,800 SF), Future Phase 1 (106,000 SF), Future Phase 2 (108,000 SF), Future Phase 3 (120,000 SF), Future Phase 4 (115,000 SF), Future Phase 5 (118,000 SF), and Future Phase 6 (162,800 SF). It also indicates existing wetlands, a future detention wetland, a future boardwalk, and a future pond. A blue circle highlights the Phase One building footprint.



LIFE™ model setup





Storm water requirements

- **Water Quality** - Treat 85% of the average annual runoff (e.g., control the first 1.2 inches of rainfall)
- ✕ **Channel Protection** - Provide 24-hour extended detention of the 1-year, 24-hour storm
- ✕ **Over Bank Flood Protection** - Match pre- and post-development peaks for 25-year, 24-hour storm

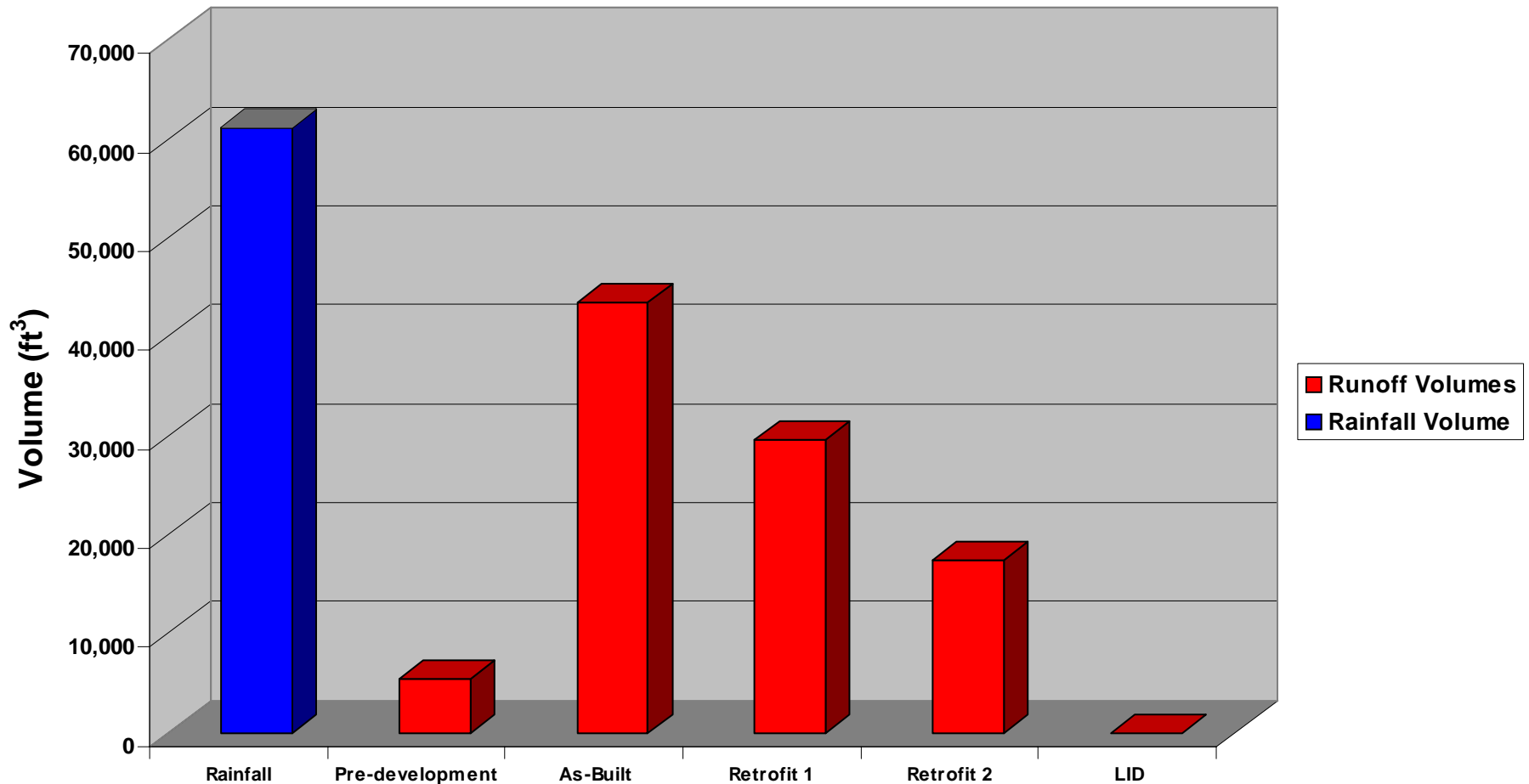


Scenario description

- ◆ **Retrofit 1** - Soil amendments for the conveyance swale
- ◆ **Retrofit 2** - Soil amendments for the conveyance swale and check dams every 100 feet
- ◆ **Full LID Scenario** - Retrofit 2 + Green Roofs + Soil Amendments on Site + Permeable Pavers

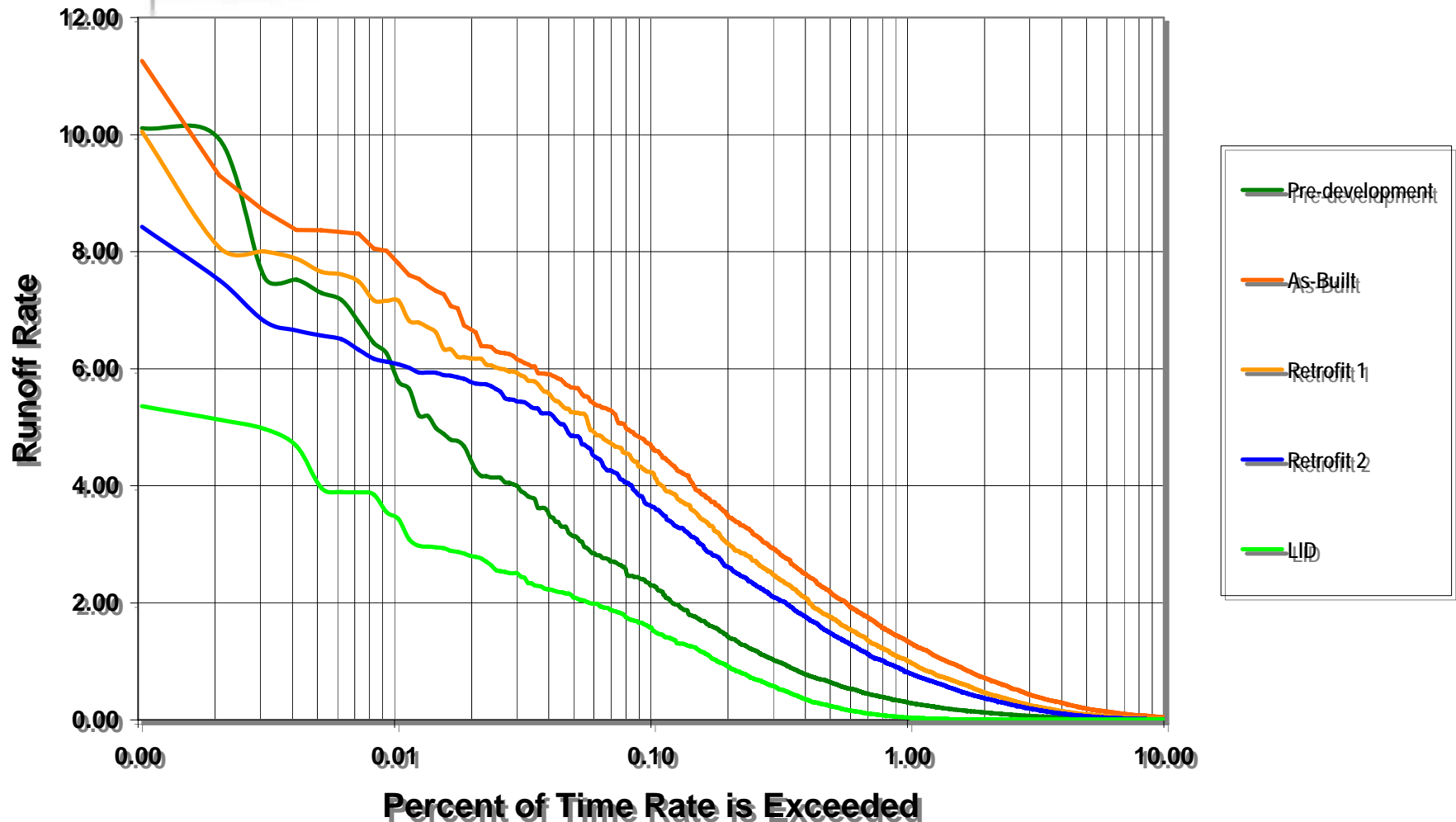


1. Water quality protection

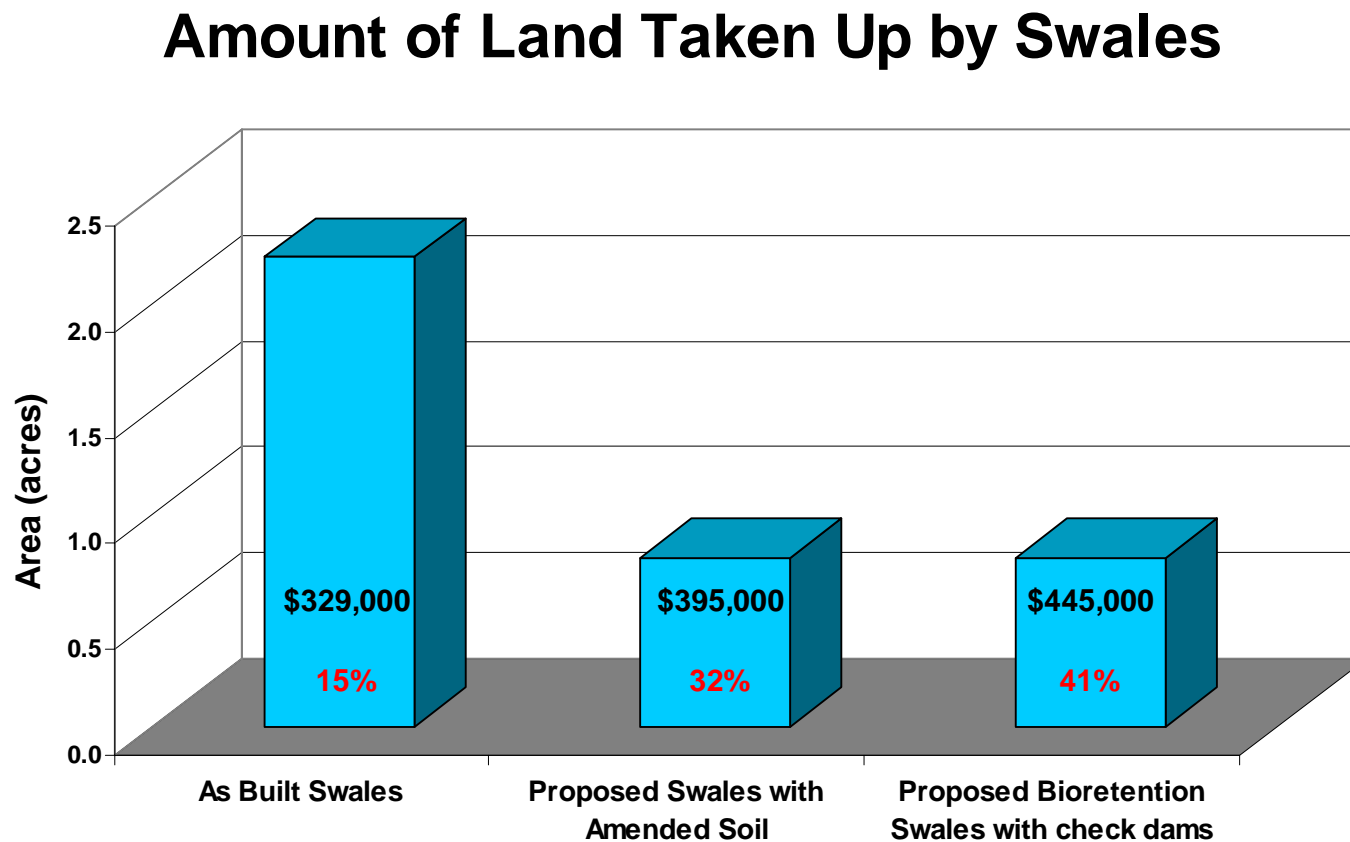




3. Over bank & flood protection (25-year, 24-hour storm, 6.1 inches)



Cost-benefit analysis



= Estimated Construction Cost

= % of Total Rainfall Infiltrated



Application summary

- ◆ LIFE model enables you to understand development impacts during the planning stage
 - Less land required for same facilities
 - Water quantity/quality source control on site
- ◆ Managers can make informed decisions on cost-benefit trade-offs
- ◆ Sound science can make **economic development** compatible with **environmental stewardship**



Questions and Answers